Mars fossils may reveal new insights into past life

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4.2-pound, potato-sized meteorite has been age-dated to about 4.5 billion years, the period when the planet Mars formed. The rock is believed to have originated underneath the surface and to have been extensively fractured by impacts as meteorites bombarded the planets. Between 3.6 billion and 4 billion years ago, a time when it is generally thought that the planet was warmer and wetter, water is believed to have penetrated fractures in the subsurface rock, possibly forming an underground water system.

Because the water was saturated with carbon dioxide from the Martian atmosphere, carbonate minerals were deposited in the fractures. The team's findings indicate living organisms also may have assisted in the formation of the carbonate, and some remains of the microscopic organisms may have become fossilized, in a fashion similar to the formation of fossils in limestone on Earth. Then, 15 million years ago, a huge comet or asteroid struck Mars, ejecting a piece of the rock with enough force to escape the planet. For millions of years, the chunk of rock floated through space. It encountered Earth's atmosphere 13,000 years ago and fell in Antarctica as a meteorite.

It is in the tiny globs of carbonate that the researchers found a number of features that can be interpreted as suggesting past life. Stanford found easily detectable amounts of organic molecules called polycyclic aromatic hydrocarbons, or PAHs, concentrated in the vicinity of the carbonate. Researchers at JSC found mineral compounds commonly associated with microscopic organisms and the possible microscopic fossil structures.

The largest of the possible fossils are less than 1/100th the diameter of a human hair, and most are about 1/1000th the diameter of a human hair—small enough that it would take about a thousand laid end-to-end to span the dot at the end of this sentence. Some are egg-shaped while others are tubular. In appearance and size, the structures are strikingly similar to microscopic fossils of the tiniest bacteria found on Earth.

The meteorite, called ALH84001, was found in 1984 in Allan Hills ice field, Antarctica, by an annual expedition of the National Science Foundation's Antarctic Meteorite Program. It was preserved for study in JSC's Meteorite Processing Laboratory and its possible Martian origin was not recognized until 1993. It is one of only 12 meteorites identified so far that match the unique Martian chemistry measured by the Viking spacecraft that landed on Mars in 1976. ALH84001 is by far the oldest of the 12 Martian meteorites, more than three times as old as any other.

Many of the team's findings were made possible only because of very recent technological advances in high-resolution scanning electron microscopy and laser mass spectrometry. Only a few years ago, many of the features that they report were undetectable. Although past studies of this meteorite and others of Martian origin failed to detect evidence of past life, they were generally performed using lower levels of magnification, without the benefit of the technology used in this research. The recent discovery of extremely small bacteria on Earth, called nanobacteria, prompted the team to perform this work at a much finer scale than past efforts.

The team of researchers includes a wide variety of expertise, including microbiology, mineralogy, analytical techniques, geochemistry and organic chemistry, and the analysis crossed all of these disciplines.

More information on the meteorite is available on the Internet at URL: http://www.jsc .nasa.gov/pao/flash/ or its mirror sites: http://cu-ames.arc.nasa.gov/marslife/ and http://rsd.gsfc .nasa.gov/marslife/

JSC friends, family study space science

Friends and family members of JSC workers know more about the space program after spending a week in a hands-on workshop.

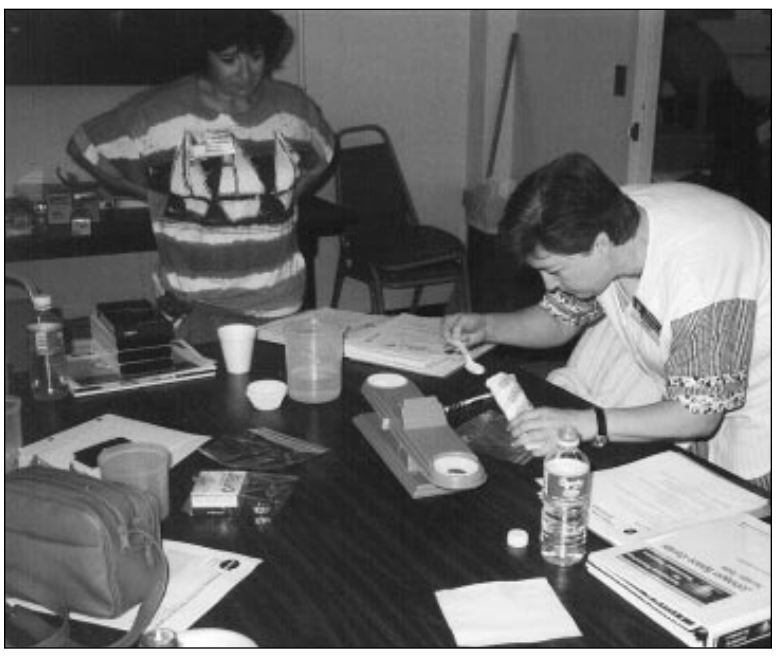
"It's our job, as educators, to educate our students to the fullest," said Jan Scanlon, a member of the teacher certification program at the University of Houston Clear Lake and sister of Mark Mangieri of Engineering. "That's where NASA comes in and helps us learn about the resources available to influence our children."

More than 40 educators spent a week at JSC learning about a variety of space subjects and the work done at JSC. The family and friends program was so popular this year that the education specialists in the Education and Information Services Branch of the Office of Public Affairs extended the program and offered two one-week workshops to accommodate all the requests.

Educators, who attended the first workshop, spent a week touring facilities, participating in classroom sessions and even attended the Early Human Testing Initiative briefing last week. Before the briefing the group visited the 20-foot chamber.

"The Regenerative Life Support facility was very exciting," said Susan Jennings, a teacher at Creekside Intermediate and friend of JSC's Labor Relations Officer Connie Pritchard. "Many thanks to Nigel Packham and Pat O'Rear for their time and for a great tour."

"The Regenerative Life Support program will inspire my students toward terrific science projects," said Pam Doiron, a teacher at Faith Christian Academy in Pasadena and a friend of Karen Wyont of Support Operations.



JSC Photos by Mae Mangieri

From top to bottom, left to right: From left, Susan Jennings, an eighth grade teacher at Creekside Intermediate School watches Brenda Babin, a secondary teacher from Gonzales Primary School in Louisiana, rehydrate food much the same as astronauts in space. The goal of the experiment is to examine the difference between the taste and consistency of space food with food prepared on Earth. Janice Scanlon, a member of the teacher certification program at the University of Houston Clear Lake, examines the cockpit of JSC's T-38. Jennings tries on a launch/entry suit during the workshop.

Two winter vacations available to employees

Employees who vacation in January may want to consider too JSC discount packages that are now available.

The Employee Activities Association is sponsoring a Caribbean Getaway. This is an 11 day cruise from San Juan, Puerto Rico on the Celebrity cruise ship Meridian. JSC employees may take the cruise after Jan. 3 at a cost of $1198, double occupancy. Cost includes round trip air from Houston Intercontinental Airport to San Juan, Puerto Rico, and 10 nights aboard the Meridian cruise ship. Stops will be made in Aruba, La Guaira, Grenada, Barbados, St. Lucia, Martinique, St. Maarten and St. Thomas before returning to San Juan.

An initial deposit of $30 per person is required at signing up, followed by a second deposit of $270 due on Sept. 5. Final payment must be made by Nov. 4. Employees may sign up at Friendswood Travel located in Bldg. 1 Rm. 134. For information call Dick McMinimy at x34037.

In addition, the sixth NASA ski week is set for Jan. 18 at Steamboat Springs, Colo. The package price of $1064 per person includes round-trip airfare from Houston Intercontinental Airport to Hayden, Colo.; ground transfers from Hayden to the hotel on Alpine Express; seven nights lodging at the Thunderhead or Ptarmigan hotel, and five ski lift tickets.

Employees also can look forward to a welcome reception and banquet, fanny pack, trip brochure and cross country skiing area. In addition, children to age 12 get to ski for free. Additional options also are available including breakfast on the mountain, sleigh rides, snow mobiles, hot air balloon rides and numerous other activities. There also is a basic land package available at a cost of $694 per person, which includes everything except airfare.

A deposit of $50 per person is due as soon as possible. For more information call Ron Davis at x31959.

Science museum seeking volunteers

Claudia Baltodano, recruiter for the Houston Museum of Natural Science volunteer services, will be at JSC from 2-3 p.m. Wednesday in Bldg. 45, Rm. 251 to discuss the museum's volunteer program.

The museum is seeking volunteers to work in all areas of the museum, from interpreting exhibits for children and families, to essential jobs behind the scenes. There are a variety of volunteer opportunities available, depending on volunteers interests and schedules.

"The Houston Museum of Natural Science is very proud to offer one of the most rewarding and exciting volunteer programs in the Houston area," Baltodano said. "Our volunteer program provides an excellent opportunity for JSC employees to become more involved in helping children and adults nourish their knowledge in science and encourage them to appreciate and love the world around them."

The museum, founded in 1909, houses the Cockrell Butterfly Center, Burke Baker Planetarium, Wortham IMAX Theatre, the world's first Challenger Learning Center and over a dozen halls of permanent natural science exhibits that the museum hosts each year.

To learn more about the museum and its volunteer program, employees can visit the museum's web site at URL: http://www.hmns.mus. tx.us: 80/hmns/home.html

Interested employees may attend the Wednesday meeting or call the volunteer office at 639-4643.

NASA offers managers fellowship programs at universities

JSC employees—primarily in the grade 13 to Senior Executive Service levels—are invited to apply for spots in academically-based programs of study in management and executive processes.

The programs are at universities such as Harvard, the Massachusetts Institute of Technology, Carnegie-Mellon and Simmons.

The criteria used by headquarters and JSC for selection are the candidate's job performance, education record, development record, significant recognition and accomplishments, purpose for participating in the program and supervisor and management endorsements.

Employees interested in being nominated for any of these management programs must first talk to their supervisor. Nominations are worked through each directorate or program office and are due to the Human Resources Development Branch by next Friday. JSC nominees will be chosen by JSC Director George Abbey and final selections will be made at NASA Headquarters. Final selections also will be based on the needs of the centers and individual needs. Each director or program manager and training coordinators has a detailed description of the program. For more information call Erica Vandersand at x31999.

Luncheon reservations for 1996 inventors due today

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Engineering for the Inflatable Rescue Device; Edgar Castro, Gregg Edeen, David Hamilton, Timothy Pelischek and Irene Verinder of Engineering, James McDede and John Rivers of Mission Operations, Kornel Nagy of the Space Station Project Office and former JSC employees Jon Kahn Donald Wade and Clarence Wesselski for the Pre-Integrated Truss Space Station and Method of Assembly; Richard Juday of Engineering for the Full Complex Modulation Using Two One-Parameter Spatial Light Modulators; Kent Castle of Safety Reliability and Quality Assurance for the Extra-Corporeal Blood Access, Sensing and Radiation Methods and Apparatuses; Doug Ming of Space and Life Sciences for the Slow-Release Fertilizer; Erik Evenson and Christian Lupo of Engineering for the Connector Systems for Structures; Edgar Castro, Horacio de la Fuente Timothy Pelischek Steven Rickman and John Schliesing of Engineering, Kornel Nagy of the Space Station Program Office and former JSC employee Reginald Berka, Donald Wade and Clarence Wesselski for the Heavy-Lift Vehicle-Launched Space Station Method and Apparatus; former JSC employee Richard Bozeman for the Accelerometer Having Integral Fault Null and the Control Method for Prosthetic Devices; Leo Monford of Engineering for the Grapple Fixture for use with Electromagnetic Attachment Mechanism; Donald Henninger of Engineering and Doug Ming of Space and Life Sciences for the Active Synthetic Soil; and former JSC employee Frederic Dawn for Protective Helmet Assembly.

Reservations for the luncheon are due today.

For more information call Mara Pena at x30837.

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